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KEY DIRECTIONS OF SECTORAL AND SPATIAL CHANGES IN THE RUSSIAN INDUSTRY

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This article considers major trends in the spatial and sectoral structure of national production and analyses the patterns of transformation of industrial systems into integrated industrial complexes, which show higher efficiency in transit conditions. The author presents a new approach to studying the structural transformation of industrial systems during the transition of the national economy, which will make it possible to identify major trends in national production. The article seeks to draw attention to the methodology of developing and implementing industrial policy and devising an algorithm of effective transition of Russian industries in the modern conditions of international division of labor.

The modernization and transnationalization of national production rests on a number of methods that make it possible for the corporate management to react rapidly to changes in the global market situation. These methods include strategic segmentation, analyzing the ability to adapt to the expected conditions, devising a company's entrepreneurial strategy, and changes in the spatial and industrial structure of production.

The transformation of national industry is associated with the introduction of mechanisms of industrial integration structures using single organizational production modules capable of rational combination and transformation of the elements of national production structure to create competitive transnational production associations, such as clusters and other production forms serving as 'growth poles' and becoming elements of the emerging framework for national production. This methodology makes it possible to develop new approaches, methods, and principles for analyzing the transformation of the national spatial and industrial system during economic transition. Current factors, features, patterns and trends in the transformation of national industrial systems are identified; a mechanism for devising and implementing a more structured industrial policy in Russia is developed.

Key words: industry, spatial and industrial changes, transition period, transformation economy, transnational production poles, international integration, economic 'growth poles', industrial policy

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Introduction

At the current stage of the world economy's development, the formation of strategic areas of national industrial development requires identifying and investigating the economic cores. This is especially true for countries with transitional economies, for instance, Russia. Scientific understanding of structural shifts in the industrial sector is traditionally identified as a priority of economic geography. Many of its achievements in the fields of axiomatisation and legislation are associated with industrial development and siting [20].

In the early 1990s, Russia was not ready for structural transformations in the national industry, whose sectors did not meet international standards. Therefore, the process of structural and spatial modernisation of manufacturing was often sporadic [19]. However, an effective structural policy towards all territorial levels of the national industry has not been developed yet, whereas solving the problem is complicated by a poor research framework for the structural transformation of industrial facilities in post-Soviet states. During the post-Soviet transition to a market economy, the focus of economic geographers shifted from theoretical problems of national industry restructuring to other issues. This makes the current study increasingly relevant [21].

Territorial and sectoral changes taking place in Russia's manufacturing industries seldom become the focus of a theoretical analysis or methodological justification. There are more questions than answers concerning the prospects of national manufacturing sector development. For instance, it is not clear how a country can benefit from international industrial cooperation between crisis-ridden CIS states, which often have a similar raw-material specialisation. How should Russia treat its natural resource potential when adapting the manufacturing sector to the global market? Is it vertically integrated or network structure that can make national produce competitive in the global market? Despite the existing efforts of Russian scholars to analyse structural transformation in national manufacturing sectors, there are still few conceptual ideas that adequately represent this process. Nevertheless, geography of Russian manufacturing has a number of unique features, which necessitate adjustments to the existing methodological approaches.

The transitional nature of the Russian economy does not make it possible to solve the problem of modernisation and development of a new manufacturing sector using either exclusively administrative or market management methods. Therefore, one of the research priorities is searching for the ways of territorial and sectoral restructuring of the manufacturing sector and the methods for territorial management in transitional economic conditions.

Research methodology

Structural changes in the sectoral system consist in transformations in the forms, structures, and methods of economic activities under the joint influence of economic, social, and other factors specific to the territory [14]. Changes in the industrial system — as well as any other territorial economic system — rest on the following parameters: sizes of companies, resource en-

dowment, economic and geographical position, qualifications of the administrative and engineering staff, etc. The industrial system consists of an aggregate of companies characterised by a certain combination of these parameters. Therefore, it is logical to consider the process of structural transformations in industrial systems of different levels as the object of research on changes in the manufacturing sector's territorial organisation.

It is worth stressing that the theoretical and methodological framework for this research rests on the conceptual mechanism and theoretical assumptions developed by national and international scholars. The theoretical ideas employed in the article were largely affected by the works of international economists, namely, J.R. Boudeville, I. Wallerstein, W. Isard, F. Perroux, M. Porter, G. Friedman, P. Hagget, G. Myrdal, T. Hägerstrand, and J.R. Lasuen [17; 28—32], as well as Russian economic geographers and economists, namely, A.I. Alekseev, P.Ya. Baklanov, A.P. Gorkin, B.N. Zimin, B.M. Ishmuratov, E.G. Kochetov, A.V. Moshkov, N.M. Mezhevich, N.S. Mironenko, L.V. Smirnyagin, A.I. Treyvish, A.I. Chistobaev, M.D. Sharygin, P.G. Shchedrovitsky [1—2; 7; 9; 12; 14; 21; 27], and others.

Unfortunately, most authoritative studies into industrial geography focus either on the Soviet planned economy or on market economies. Studies into changes in national industrial systems during an economic transition are rather schematic and they lack a geographical component. The trends in and features of structural and spatial changes in the industrial segment of Russian economy are not considered in sufficient detail.

This work presents a new conceptual approach to studying spatial and structural changes in the national industrial system in a transitional economy, which makes it possible to identify key trends in the Russian industry.

Conceptual framework for space organisation and changes in industrial systems in transitional economies

The concept of polarised development of states, theory of competitiveness, and the concept of international clusters in the context of their prospective internationalisation as a form of transboundary cooperation comprise the methodological framework for a comprehensive analysis of changes in industrial systems in transitional economies.

It was established that, due to its specific economic and geographical features and transitional complication, Russia shows a slower rate of production structures' modernisation and adaptation to international division of labour [12]. In line with current development standards, organising national production requires applying mechanisms of integrated production structure formation using single organisational production modules capable of uniting and transforming elements of the national production structure into competitive international production modules.

During a transition to a market economy, internationalisation can become one of the benchmarks for the modernisation of Russian industry and its further participation in IDL. In this environment, disconnected stages of national production comprise a single *internationalised reproduction cy-*



cle — supranational expanded reproduction process, where national and supranational economic agents participating in the formation of a single *internationalised reproduction space* become elements of the global reproduction process. This space has a specific territorial and industry structure consisting of two independent internationalised components — *production and distribution*. Therefore, it affects shifts in the national manufacturing sector [9]. It is assumed that the internationalised parts of these components comprise *multinational reproduction poles (MNRP)* — internationalised territorial production cores (fig. 1). MNRPs tied together through international cooperation can form intermodal ‘growth corridors (axes)’.

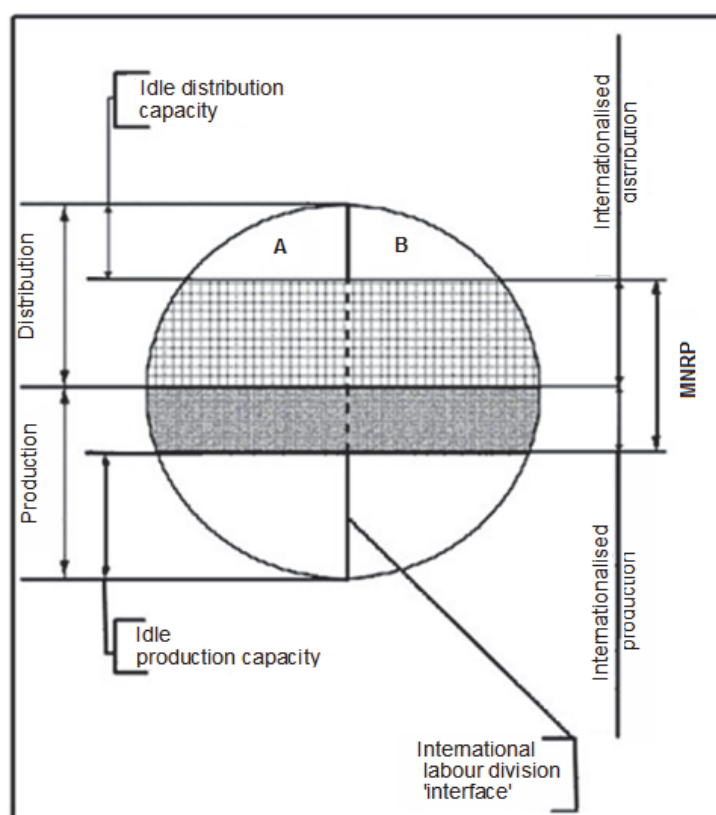


Fig. 1. Space and industry structure of a multinational reproduction pole (MNRP):
A, B — national industrial units and facilities

It is well known that international cooperation can fragment and integrate competitive national manufacturing units into several multinational formations. Moreover, the key modules comprising structural elements for internationalised industrial systems developed in Russia in the early 2000s. This was a result of the increasing research and technology exchange and new financing opportunities for large-scale objects constructed by MNCs within production and commercial agglomerations (PCAs) — the mobile ‘cores’ of MNRP. As a rule, PCAs function as international associations or consortia, for instance

joint subsidiary corporations established by several corporations operating in various fields [9]. They supply produce to each other at all stages of the production process, which has gone beyond the national framework.

Against the background of developing production, research, and investment cooperation, exchange of commodities is shifted to a new interface (between firms, corporations, enclaves). It transforms into exchange between production and investment units.

In Russia, the above transformational processes created a *trend towards the adaptation of large national manufacturing MNC to IDL as a result of accelerated development of intra-corporation labour division*, i.e. specialisation of companies established on a multinational basis and performing the role of MNRPs in terms of organisation and management.

Slow adaptation of the transforming part of Russia's manufacturing sector to the IDL system and rapid PCA element formation resulted in the emergence of a different trend — *territorial and sectoral curtailment of production of a wide range of goods and the 'displacement' of consumer product lines, equipment, and machinery manufactured using Soviet technological solutions*.

When considering the current mechanisms of national development of social division of labour, it is important to take into account the unity of and interaction between the inter-enclave and international division of labour. The ongoing reorientation of international credit flows creates results in the expansion of PCA activities in implementing complex national project, which impart mobility to MNRPs. MNRPs rapidly move to the parts of geoindustrial space characterised by the most lucrative production conditions. *Shifts between inter-enclave and international social division of labour assumes a pulsing nature*, which reflects another world economic trend, which spreads to the Russian manufacturing sector as a part of the world economy. The complication of social development of labour in the geoindustrial space results in a constant revision of the national industry and territorial structure of production.

This study pays special attention to the issues of effective participation of transforming industrial models in IDL. Therefore, getting the maximum effect from the inclusion of Russian industrial modules in IDL requires a thorough differentiated selection of competitive industries. These can be production facilities, whose ongoing transformations give them an opportunity to be included in IDL through exporting their produce. At the same time, they should have sufficient infrastructure to ensure returns on imported equipment and machinery, components and raw materials [16; 18].

However, in practice, the 'loosely regulated' entry of Russian industries to the global market without simultaneous involvement of related industries triggers isolated negative processes in the country's economy. Hypertrophied and 'isolated' development of individual manufacturing industries results in the artificial moral ageing of many related industries. This accounts for another trend in changes in the Russian manufacturing sector [14; 23].

A transitional period requires new economic models (combinations of different model types), which would narrow the gap between the conditions



of economic agent functioning in the national and international environment. It is impossible to benefit from the effect of market relations diversity, if the country's industry is represented in the international market by giant monopolists. Moreover, the degree of financial and industrial monopolisation in some Russia structures is almost incomparable with any large Western corporation. Unfortunately, this situation persists. Therefore, another trend in the development of national economy relate to the *skewed structure of Russian manufacturing sector 'sacrificed' to the three industrial enclaves — the raw materials, defence, and energy sectors*. The economic boundaries of these industrial sectors, which have suppressed all other industries, almost coincide with the national borders [27].

However, strategic interests require not the destruction of monopolistic production structures, but rather their restructuring into new economic alliances including innovative, hi-tech, competitive 'populations' [22]. This can result in the emergence of national market structures — financial industrial groups, clusters, MNCs, and SEZs — capable of making the national production structure more harmonised and diverse, which will create optimal conditions for introducing the multinational element into production [8; 9; 15].

As mentioned above, the production and investment model contributes to the 'fragmentation' of national production chains and takes some of their elements beyond the national framework. However, each production stage is supported by a certain organisational and functional structure (production, research, investment, service, international trade, and other stages) characterised by specific Territorial and sectoral organisation. It is well known that the system of world economic ties is comprised of economic cells constituting a lattice, whose nodes represent organisational production structures (fig. 2). Combinations of different-purpose structures forming special associative groups create production alliances — consortiums, MNCs, PCAs, etc. An analysis of such structures shows the repetition of certain cells — *individual organisational industrial modules*. Regardless of their combination, these modules can change their structure without changing in general due to the presence of three components: a) an isolated production cell; b) production connection with other agents; c) a connection with the economic environment. Different organisational structures — agents of multinational communication characterised by a certain territorial and industry organisations and affecting structural shifts in industrial production — can be created based on isolated organisational production modules [9].

A crucial fact for understanding the development of strategic situation in production internationalisation is that it is an isolated organisational production module that participates in the formation of the inter-enclave (inter-firm) 'interface' and 'layered structure' of commodity circulation. It is important to understand that the components of an isolated module do not remain unchanged having integrated into a certain structure — they assume new qualities under the influence of the market of their environment. These transformations follow certain patterns that are to be taken into account when developing the nodes of new production structures [14].

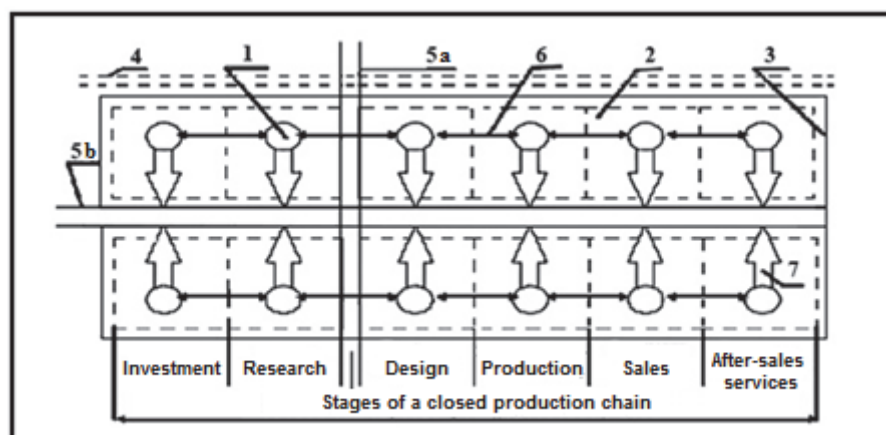


Fig. 2. Multinational territorial production model (isolated organisational industrial modules and their interconnections during the formation of multinational communication agents):

- 1 — individual national territorial production unit (company); 2 — isolated module — an organisational production structure (an economic geographical structure of the functioning of an individual production cell); 3 — an international organisational production structure;
- 4 — inter-enclave interface (cooperation between international production structures);
- 5 — international interface (cooperation between complete national elements of the territorial production chain (5a) and supranational parts of the fragmented territorial production chain (5b)); 6 — direct connection between individual national territorial production units at certain production stages; 7 — territorial production connections between homogeneous enterprises.

Therefore, it is important to understand that Russia's new industrial policy should aim at achieving the optimum balance of between the national and international industry, domestic and multinational production structures, and integration and disintegration processes [7; 16]. Moreover, the latter will create the basis for the production module in the world economic structures and serve as an effective governmental tool to 'nurture' MNRPs [1]. At the same time, national production structures show certain prerequisites for integration with international companies and forming MNRPs. Firstly, unique post-Soviet production structure gradually transform into MNCs in market conditions, the largest Russian energy and defence corporation are acquiring multinational status. Secondly, international consortia with the participation of CIS industrial and financial structures are emerging by analogy with regional development associations. Thirdly, a significant number of Russian corporations — considered reliable partners by international companies — develop based on existing Russian industrial structures' production and supply elements in the CIS countries [1; 25].

Theory of polarised development and the concept of industrial cluster as a basis for the national industrial policy

In the 1990s, Russia witnessed hurried and chaotic privatisation of industrial facilities accompanied by experimenting with Western reform models, which resulted in the destruction of production facilities of local and district



significance throughout the post-Soviet space. Most of destroyed cross-industry facilities could not be restored due to their technical obsolescence. The disconnected elements of energy generation cycles, especially, those of upper and medium stages, could not compete with their counterparts from developed countries. However, some of the relatively competitive elements of the energy sector transformed, modernised, and integrated into the market — including multination — production structures.

Therefore, a way out of this situation is associated with creating a research framework for a long-term strategy for national economic development, devising an effective industrial policy, and investment support for all regions with ‘identifying’ growth poles, and encouraging innovations. This requires a new conceptual approach and a combination of modern methodologies for studying spatial and structural changes in national industrial systems in transitional economies.

The concept for a new industrial policy may be based on the theory of polarised development and economic core associated with the names of F. Perroux and J.R. Boudeville. It can also employ the methodology based on M. Porter’s *industrial cluster concept*. Moreover, the cluster concept and the theory of polarised development are brought together by the idea of regional development [28—31].

It is worth stressing that the public industrial cluster policy is a new method to manage the microeconomic policy towards new economic objects — spatial and non-spatial industrial clusters. There are two types of cluster policy — those carried out by the authorities (‘top-down’) and economic entities (‘bottom-up’).

In Russia, a cluster policy will require relevant tools for assessing the efficiency of its implementation at different spatial levels. Therefore, a cluster analysis of the production structure’s functioning can be carried out at different levels. At the macrolevel, it focuses on the interaction between industry groups on the national economy scale, at the mesolevel, on intra- and inter-industry connections within the production chain, at the microlevel, on connections between firms.

Depending on the information basis and research purposes, cluster analysis tools may include expert evaluations, network analysis, analysis of input-output tables, statistical patterns, etc. These methods help to estimate the intensity of interactions between firms based on information exchange and innovative connections, trade connections, investment, similarities in technical solutions and factors of production, etc. [4].

In a transitional economy, the cluster approach is preferable to the industry approach as a tool for studying the aspects of international industrial cooperation, since the former is aimed at analysing the whole value chain in the conditions of increasing IDL [18]. Therefore, one of the trends in the changes in the Russian sectoral structure is the emergence and development of *effective regional and sectoral clusters as a form of territorial organisation and modernisation of the national industry connected by transport into network, area, and liner-nodal production structures* [4; 13; 26].

However, due to the impossibility to provide maximum public support for all industrial clusters at the first stage of reforms, it is important to identify

priority regional or industrial clusters (these can be both export and import-oriented clusters). Such innovative clusters develop based on an analysis of the regional contribution to the structure of the country's international trade.

At the same time, cluster differentiation of national regions emphasise the connection between the innovation index and the size of the regional centre, which activates the trend towards the formation of large cities aimed at developing regional innovation potential. To prove this assumption, experts from Russia's 'North-West' centre for strategic research compared the classification of Russian regions by innovation index with the distribution of hi-tech industries across regions. Based on indexing results, the experts identified six groups (cluster) of Russian regions showing different innovation levels. Such experience in the rational organisation of national production and economic space can be adopted within the new Russian industrial policy [22].

Problems and prospects of the new strategy for territorial industrial development in Russia

From the perspective of the emerging national industrial policy, one of the complications is the impossibility of adopting new complex programmes for overcoming socioeconomic and territorial/industrial disparities between Russian regions.

First, it is important to consider the new elements of industrial and investment policy, which — following the logic of economic reforms — become crucial throughout the transitional period. It seems that they require a clearer differentiation of objectives and priorities by the types of industrial regions along the 'centre-periphery' axis.

An important shift in the Russian industrial policy, which is already underway (but not fully acknowledged), is the reorientation from the traditional development of new industrial district to using and modernising old central industrial districts. The area of Russia's unreclaimed lands is huge. Most industrially equipped and economically active territories belong to the 'major belt of settlement and economic activities'. The country's European part accounts for almost 80% of industrial production. All the above has an immediate bearing on the objectives of national industrial development, since it manifests the relative excess of territories for economic purposes within the country's European macrocore. The vast total (and even reclaimed) territory with a low level of industrial development in many areas turns from a resource for intensive development into a liability associated with the threat of geographical 'sputtering' of limited funds.

Over many years, the increasingly expensive reclamation of new distant territories was justified by the need for the country's self-sufficiency. However, the abundance of resources, including fuel and energy, does not automatically mean a decisive economic advantage. The latter depends on the broadly interpreted innovation potential of a country and the rate of introducing innovation into different areas, including the development of old industrial districts. This process is stalled by allocating significant funds to newly reclaimed regions.



A number of scholars stress that it is easier to create something new on a new site. There are arguments in favour of this position [14; 27], namely, the analysis of diffusion processes at the intra-district level, where innovation waves often move towards the free space. However, this is, firstly, incompatible to the geographical disparities typical of Russia. Secondly, the reclamation process is of traditional, rather than innovative nature, being a consequence of a many years' orientation towards extensive industrial growth, increase in the receipts section of the fuel and raw materials balance, and 'by default' usage of the existing construction facilities, transport infrastructure, and excessive workforce (the 'advanced' Russian regions are relatively overpopulated in comparison to those in developed countries). Thirdly, despite all possible exceptions, in the case of a dilemma between reclaiming new and modernising new districts, there is an important argument in favour of the latter — it is, as a rule, cheaper. Fourthly, the reorientation of industrial policy towards earlier reclaimed districts is connected with the industrial structural and sectoral, as well as foreign economic, restructuring of the national economic.

Abandonment of developing resources in difficult to access areas is means to save them for next generations and to conserve the habitat of indigenous population. The abandonment of support for earlier reclaimed industrial areas is often perceived as cultural and historical nihilism and disrespect for their numerous residents. Moreover, the introduction of new industrial facilities in the 'old' districts contributes to the structural 'rejuvenation' of national economy.

The macrosectoral and macroregional proportions in the reproduction process are closely connected. The hypertrophy of the 'heavy' lower industrial level is associated with the forced capita-intensive reclamation of resource districts. Therefore, giving priority to the industrial macrocentre is explained by both social and economic interests.

It is important to understand that, in the modern conditions, a strategy for regional industrial development requires well-grounded choices. At first, one can expect the stabilisation and even conservation of the established territorial structure of basic production facilities. This course of events is logical, since, in the times of dramatic economic transformation, traditions districts of a country's industrial macrocentre become the site of profound but not immediately visible qualitative shifts crucial for the national economy.

The districts of Russia's industrial macrocentre are very different, but they are brought together by a major and rather typical spatial process — the centripetal concentration of population resulting in the territory's socioeconomic polarisation. However, since this a long-term process that is not likely to change in direction over the next two-three decades, it should be treated unambiguously within the national industrial policy.

A national industrial policy can be characterised by different levels of activity and, depending on the available resources, it can include services of territorial and sectoral, cross-sectoral, and inter-territory coordination (mediation between districts striving to get rid of part of their production capacities and those interested in diversification), creation of centralised funds to

‘off-load’ leading industrial centres and develop the periphery, direct public financing of information and infrastructure preparation of the territory up to creating nodes and science parks. There is also possible to encourage miniaturisation of activities, since a small hi-tech enterprise can be integrated into regions of different ranks. For instance, the policy of eliminating unprofitable enterprises and replacing them with hi-tech companies is pursued in Moscow.

It is well known that the ‘deindustrialisation’ of earlier reclaimed industrial districts of Russia through the spatial diffusion of certain industries took place as early as the Soviet times. This process created ‘branch zones’ supplementing the large industrial facilities of the centre. However, this process can hardly be considered natural and stable during a transitional period. Identifying its ‘artificial’ component, including the role of administrative bans on establishing and expanding industrial facilities in large centres, is not an easy task. Diffused industrialisation and the development of ‘branch’ industries are hampered by the universality of large enterprises and discrepancies in the infrastructural development of territories. The availability of construction facilities, communications, and services sectors differentiates the conditions for manufacturing units entering the area of small town settlement. At the same time, regions with large industrial construction sites acquire significant growth inertia.

These trends are less evident in the case of growth inertia of large urban industrial agglomerations. To a degree, it is a reason behind the industrial policy being based on the traditional restrictive administrative measures. There is also an inverse relationship — a psychological attitude of people, communities, and corporations striving to ‘make it’ in the prestigious centre and scared of leaving it. There are hardly grounds for hopes for launching small enterprises with flexible production programmes. These programmes are often associated with the economic reform aimed at production modernisation carried out in collaboration with western businesses. As all novelties, they gravitate to the major creative centres. Independence from energy resources and the intra-industry agglomeration effect does not mean neglecting the information, infrastructural, and social development of the territory.

A breakthrough in regional industrial development cannot be imposed ‘top-down’, since it is always a result of the interaction between demand for the territory from entrepreneurs and relevant supply. Since most population shows a geographically selective demand within the vast earlier reclaimed core of Russia, this demand should be met through increasing the capacity of corresponding industrial areas.

Conclusions

The proportional and dynamic development of a competitive industry requires introducing new technical solutions. Let us consider the study conducted by the Urbanica spatial planning institute from Saint Petersburg aimed at identifying the results of spatial and sectoral transformation of the Russian manufacturing sector after two decades of market economy. The



study showed the active development of the cities of 'industrial innovation' concentrating Russia's industrial potential and the most relevant and in-demand innovations [5]. At the same time, almost all production structures are located in Russia's 250 most developed industrial centres.

The development of market mechanisms within the Russian industrial space stimulated regional processes partially connected with the old trends — the development of natural monopolies, modernisation of dominant enterprises, establishment of export-oriented and import-substitution companies, construction of new industrial facilities in Siberia, the Far East, and High North, etc. The new trends are as follows: *an increase in the rent of capital, polarisation of the national industrial space, multidirectional changes in the key manufacturing industries, an increase in internal cohesion of regional production, compression of the country's industrial space, increasing orientation of regional industrial ties and proportions on the neighbouring national and international markets, growing differentiation of national industrial space in line with foreign economic ties, etc.*

The role of modern forms of industrial production organisation — clusters, financial industrial groups, MNCs, SEZs, and science parks concentrating the technical, industrial, research, and financial potential — is increasing [3; 10; 11; 24]. The market forms of national industry organisation can serve as the basis for creating Russia's new industrial framework for the development of increasingly complex growth strategies, for instance, those suggesting the development of new sectors of an innovative economy.

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